

## **THE TRACE GAS ANALYZER FOR EXTRA-VEHICULAR ACTIVITY**

**T. Abbasi<sup>1</sup>, M. Christensen<sup>1</sup>, A. Chutjian<sup>2</sup>, M. Darrach<sup>2</sup>, and M. Villemarette<sup>1</sup>**

**<sup>1</sup>Oceaneering Space Systems, Houston, TX 77058**

**<sup>2</sup>Jet Propulsion Laboratory/Caltech, Pasadena, CA 91109**

### **ABSTRACT**

The TGA is a self-contained, battery powered, mass spectrometer tool designed for astronaut use during Extra-Vehicular Activities (EVA, or space walks) on the International Space Station (ISS). The TGA contains a miniaturized quadrupole mass spectrometer array (QMSA) which is optimized to determine the partial pressures of ammonia, hydrazines, nitrogen, and oxygen. The TGA integrates the miniature QMSA and its electronics, developed and built by the Jet Propulsion Laboratory (JPL); with OSS-provided electronics, cabling, and packaging. The QMSA ionizes the ambient gas mixture and analyzes the component species by their atomic and molecular mass. The TGA program is an example of fast insertion of new technology. As the TGA developer and integrator, OSS led the transformation of a 19-inch rack mounted laboratory instrument into an EVA tool that can be either hand-held, or mounted to the astronaut's mini-workstation or body restraint tether (BRT). OSS was also responsible for flight certification. Because of its small size, low power consumption, and versatility, the TGA can also be adapted to measuring hydrazine concentrations in a shuttle or ISS airlock, and cabin-air quality within a spacecraft for long-duration human flight.

This work was supported by NASA and NASA/JSC through agreements with JPL/Caltech and OSS.